

Houston Affects the Earth

by ReadWorks



When Houston's mayor Bill White went to work in 2008, he knew the city needed to make some changes. The city of Houston, Texas, is home to over two million people. It is the fourth most populous city in the United States and it takes up about six hundred square miles of land. The city is located in the southeastern part of Texas. It sits on the Gulf of Mexico.

Houston is sometimes called the "Energy Capital of the World." This is because a lot of oil refineries, natural gas production, and other energy companies are in Houston. Energy runs Houston. It creates jobs and powers local businesses and homes. But energy also makes an impact on the local environment. The ships that come to Houston to deliver petroleum disrupt local marine environments by producing waste emissions, noise and pollution. The processes that turn crude oil into gasoline and other petrochemicals release chemicals into the air. Too many chemicals in the air lead to air pollution. This affects people in Houston as well as the animals that live in or fly through the area.

In 2008 Mayor White started a campaign to reduce pollution in Houston. He made local factories and oil refineries reduce pollution. Mayor White worked to reduce the impact of energy consumption in Houston. In 2008, he increased the use of solar energy in the city. He put solar panels on several city buildings. The sun shines a lot in Houston, so capturing energy from the sun is easy. The energy it produces does not create the kind of pollution created by coal, gas and oil. It can be stored in batteries for use at night.

People in Houston were coming to understand their impact on the Earth's environment. People in Houston, like people all over the United States, need gasoline in order to drive their cars. They also need natural gas and electricity to run their homes and businesses. This energy consumption increases the amount of carbon dioxide released into the atmosphere and changes the air quality.

People also need water to drink, bathe, wash their clothes, and prepare their food. People in Houston were starting to see that the water and food they used were taken out of the Houston-area environment. It was therefore not available for non-human use. These people started to ask themselves if they could use less. Could Houston have less impact on the environment?

In 2010 the people of Houston elected Annise Parker to be mayor. Mayor Parker wanted to build on the work Mayor White had done. She wanted Houston to be called the "Energy Conservation Capital of the World." She started a "Bike to Work Day" to encourage people to drive less. Driving less means people use less gasoline. That means less carbon dioxide is released into the atmosphere.

Businesses worked with Mayor Parker to start "Lights Out Houston," a program that gets office buildings downtown to turn off their lights at night. Turning off the lights helps conserve electricity. Turning off the lights is also good for wildlife. A city that is bright at night can affect the way birds migrate. At night a large, bright city like Houston is even visible from outer space!

The people of Houston have applied the ideas of energy conservation to other areas, including water use and farming. The water in Houston comes from Lake Houston. Lake Houston is a reservoir, a holding facility for water that was created by building a dam on the San Jacinto River. The reservoir was completed in 1953 when the city needed to guarantee more water for its growing population. (A dam stops the flow of water in a river and creates a lake or reservoir. The lake or reservoir must be managed to make sure it does not overflow, and to protect the wildlife that live in the river.)

As Houston grows in terms of population, so will its need for water. The city of Houston now

sells rain barrels for rainwater collection. Rain barrels can be used to collect rainwater. This water can be used for watering gardens and lawns. Doing so will reduce the amount of water the city takes from Lake Houston.

The city has started community gardens. These gardens allow Houston residents to grow their vegetables in containers in the city. This way they do not have to rely as much on farms. Land that was used for farms might someday be allowed to rest. The animals that lived on the land before it was a farm could return. The water that was used to grow the plants on the farm would not be used.

Life in Houston has changed since 2008. The changes have been good for the environment.

Name: _____ Date: _____

1. What was the goal of the campaign Mayor White started in 2008?

- A. to produce more coal, gas, and oil in Houston
- B. to get people in Houston to drive less
- C. to reduce pollution in Houston
- D. to stop the ships from delivering petroleum to Houston

2. The city of Houston started more community gardens. What has been one effect of these gardens?

- A. Vegetables are readily available to people that live in the city.
- B. Animals are leaving the farms and going to the city gardens.
- C. More farm land is being used to grow fruits and vegetables.
- D. More water used on farms that grow fruits and vegetables is wasted.

3. Which of the following sentences provides evidence that the people of Houston took action to make their city a better place?

- A. People in Houston were coming to understand their impact on the Earth's environment.
- B. People in Houston, like people all over the United States, need gasoline in order to drive their cars.
- C. People in Houston were starting to see that the water and food they used were taken out of the Houston-area environment.
- D. The people of Houston have applied the ideas of energy conservation to other areas, including water use and farming.

4. What can be concluded about the way the recent mayors of Houston have viewed the issue of pollution?

- A. Pollution is an issue that should be actively addressed.
- B. Pollution is an issue which the people of Houston can do nothing about.
- C. Pollution is an issue which politicians do not have the resources to address.
- D. Pollution is an issue which can only be addressed at the state level.

5. What is the passage mostly about?

- A. how the people of Houston are conserving water
- B. how the people of Houston took steps to reduce their impact on the local environment
- C. how the people of Houston elected Mayors that were focused on reducing pollution
- D. how the people of Houston plan to deal with population growth

6. Read this sentence: "The ships that come to Houston to deliver petroleum **disrupt** local marine environments by producing waste emissions, noise, and pollution."

Which word could best replace the word **disrupt** as it is used in this sentence?

- A. assist
- B. upset
- C. interfere
- D. reduce

7. Choose the answer that best completes the sentence below.

Energy is good for Houston in that it creates jobs and powers homes and companies; _____, this same energy has a huge impact on the local environment.

- A. particularly
- B. thus
- C. second
- D. however

8. List at least two things Mayor White did to reduce pollution in Houston.

9. Houston is sometimes called the "Energy Capital of the World". Mayor Parker wanted Houston to be called the "Energy Conservation Capital of the World."

Explain the meaning of both titles and how they are connected.

10. Explain Mayor White's role in the efforts to reduce pollution in Houston that started in 2008. What might have happened had he not been elected? Use evidence from the passage to support your answer.

Adventure on a Hot Air Balloon



The wind is starting to blow stronger, and when you're riding in a basket under a hot air balloon, just 400 feet above ground, that's not necessarily a good thing. Keith Rodriguez looks to the horizon and squints. He had planned to take off from Scioto Downs, a horse racetrack south of Columbus, Ohio, fly a few miles north, and land his balloon in a barren cornfield next to his pickup truck.

Then the wind changed. Instead of a light breeze from the south, now Rodriguez's bright red balloon is getting hit by stronger, colder winds headed west. He has plenty of propane fuel in his tank—he probably could ride the wind halfway to Pennsylvania. But that would be dangerous. Rodriguez's choice of landing sites just became very limited. As the balloon switches direction and floats east, everything below becomes a wide carpet of suburban sprawl—big-box stores, major highways, and strip malls. Beyond the stores lie forests.

The only factor in Rodriguez's favor is that it's early, just after 7 a.m. The highways are filling up with people driving to work, but otherwise the morning is quiet and still.

"Oh boy," Rodriguez thinks. "If I don't land, like now, this could get bad."

The balloon has no propeller or engine, so Rodriguez can't change direction on his own—he's entirely dependent on the wind. The only thing he controls is altitude. He does this by changing the properties of two invisible gases: air and propane. Sitting on the floor of the wicker gondola are three tanks of propane, compressed to its liquid form. The tanks are connected via black rubber hoses to two burners overhead. Each burner is nearly as big as Rodriguez's head.

Rodriguez turns a knob on one side of the burners. This releases propane from a tank into the heating coil, where it is ignited by a pilot light. This heats the propane from a liquid into a gas. The gas catches fire, and flames leap two feet high into the balloon.

The balloon rises. Rodriguez has a plan in mind. The flame heats the air inside the nylon balloon. This works on a simple principle: hot air is lighter than cold air. One cubic foot of air

weighs about an ounce. If you heat that air by 100 degrees, its weight drops by about 7 grams. So every foot of heated air inside Rodriguez's balloon can lift about 7 grams. Just by himself, Rodriguez weighs 170 pounds, which equals 77,110 grams. That means he needs about 11,015 cubic feet of hot air just to raise his own body off the ground. This is why hot air balloons are so big—they must trap tremendous amounts of heated air. Rodriguez's balloon is a common size, trapping about 100,000 square feet of air. The balloon is 90 feet tall and 65 feet wide.

As Rodriguez gives his short burst of flame, the air inside swirls in complicated, invisible patterns. Little of it escapes out the hole in the bottom—instead, it cools off gradually by coming into contact with the surrounding air outside the balloon's thin nylon wall. As this happens, the balloon gradually sinks. To drop altitude more quickly, Rodriguez can pull a cord attached to a parachute valve at the very top of the balloon. Since the hottest air sits at the top, this releases the balloon's most buoyant air and increases the speed of descent.

Rodriguez gives the cord a short pull, and the gondola drops.

"I don't have an altimeter, and I can't really see anything happening inside the balloon," Rodriguez thinks. "I have to pilot by feel."

Pushed by the wind, the balloon is flying quickly now. It's floating over the back wall of a Wal-Mart when Rodriguez grabs hold of the parachute valve cord and gives it a long, hard tug. The balloon drops. Quickly. The hot air balloon is sinking, but still flying forward.

It looks as though it's about to slam into the edge of Wal-Mart's roof but it sails over it, with only about 15 feet to spare. Still, Rodriguez does not let go of the cord. He drops and drops, right between the light poles of the nearly empty parking lot. Just a few feet above the ground, Rodriguez releases the parachute cord, turns the knob above his head and fires both burners. The steep descent slows. The gondola touches lightly against the asphalt, and then drags to a stop. There are only two people in the parking lot, standing near the entrance to the store. They look toward the balloon, their eyes and mouths open wide in shock.

"That was a little closer than I expected," Rodriguez says to himself, laughing. "I really needed to land quick."

Name: _____ Date: _____

1. What makes landing the hot air balloon a challenge?
 - A) the gondola
 - B) the wind
 - C) the parking lot
 - D) the time of day

2. What problem does Keith Rodriguez solve?
 - A) how to fly from Ohio to Pennsylvania in his hot air balloon
 - B) how to increase the altitude of his hot air balloon
 - C) how to safely land his hot air balloon
 - D) how to change direction on his own in his hot air balloon

3. A hot air balloon floats because the air inside the balloon is warmer than the air outside of it. What information from the story supports this statement?
 - A) Hot air is lighter than cold air.
 - B) One cubic foot of air weighs about an ounce.
 - C) The air inside the balloon swirls in complicated, invisible patterns.
 - D) The hot air balloon is sinking, but still flying forward.

4. Based on information in the passage, what would make a good landing area for a hot air balloon?
 - A) a large, open space with no buildings
 - B) a large space with lots of tall buildings
 - C) a small, narrow space near a highway
 - D) a small space, such as the roof of a building

5. What is this story mainly about?
 - A) a hot air balloon that scares lots of people when it lands in a parking lot
 - B) a hot air balloon that does not work properly
 - C) a person who gets stuck up in the air and does not know what to do
 - D) a person trying to land a hot air balloon in difficult conditions

6. Read the following sentences: "To drop **altitude** more quickly, Rodriguez can pull a cord attached to a parachute valve at the very top of the balloon. Since the hottest air sits at the top, this releases the balloon's most buoyant air and increases the speed of descent."

What does the word **altitude** mean in the sentence above?

- A) length
- B) width
- C) height
- D) volume

7. Choose the answer that best completes the sentence below.

Keith Rodriguez was planning to land in a cornfield; _____, he changes his mind because of the wind.

- A) previously
- B) however
- C) as a result
- D) for example

8. What effect does pulling the cord attached to the parachute valve have on Rodriguez's balloon?

9. Based on what the story explains about air temperature, why does pulling the cord have this effect?

10. Keith Rodriguez makes a successful but dangerous landing in a parking lot. Based on information in the story about his location, the weather, and how hot air balloons work, explain whether his decision to land in the parking lot was or was not a good idea. Please use evidence from the passage.
